POLISH OR ETCH STOP LAYER

This application claims the benefit of the June 5, 2001, filing date of United States provisional patent application serial number 60/295,996.

FIELD OF THE INVENTION

The present invention relates to microelectronic devices and, more particularly, to compositions for polish stop layers and etch stop layers in such devices.

BACKGROUND OF THE INVENTION

Microelectronic devices, such as ultra large scale integrated (ULSI) circuits, are commonly formed as multi-layered devices having alternating layers of conductors and dielectric material. Each of these layers is deposited separately and often the layers are polished to a high degree of planarity prior to the deposition of an overlying layer. Chemical mechanical polishing (CMP) is the leading process used to produce planar multi-layer metallization systems in modern ULSI circuits.

Prior to depositing a metal interconnect or conductor layer, a relatively thick dielectric layer is deposited over a substrate and any integrated circuit devices formed on the substrate. The dielectric layer is then polished using a chemically active slurry and a polishing pad to produce a very flat or planar surface. Contact holes or vias are etched in the dielectric material. A barrier metal and a tungsten film are then deposited over the etched dielectric in order to fill the vias. The tungsten film is then polished off the surface leaving a flat surface with the contact holes or vias filled with plugs of the barrier metal and tungsten. The metal interconnect layer is then deposited over the polished dielectric layer, forming electrical connection with the tungsten plugs.

Removal of the tungsten film from the dielectric surface to form the via plugs commonly employs a CMP process. This process must remove the tungsten film from the surface without polishing away too much of the underlying dielectric and without adding non-uniformity to the dielectric thickness. For this reason, titanium nitride (TiN) is generally used as a barrier metal and adhesion layer over the dielectric